

REMARKS

Applicants have studied the Office Action dated May 1, 2003 and have made amendments to the claims. It is submitted that the application, as amended, is in condition for allowance. By virtue of this amendment, claims 1-23 are pending. Claims 1-3, 6, 10-13, and 20 have been amended, and new claims 21-23 have been added. Reconsideration and allowance of the pending claims in view of the above amendments and the following remarks are respectfully requested.

The drawings were objected to because Figures 1 and 2 were not designated by a legend such as "Prior Art". The drawings were also objected to because Figures 1 and 3 contained element boxes that were not labeled. Please substitute the attached Replacement Sheets of drawings for the corresponding original sheets. Figures 1-3 have been changed as shown in red in the attached Annotated Marked-up Drawings. In particular, Figures 1 and 2 have been labeled "Prior Art" as requested by the Examiner. Additionally, Figures 1 and 3 have been amended to label the element boxes as requested by the Examiner. No new matter has been added. In light of these amendments, it is submitted that the objection to the drawings should be withdrawn.

The specification was objected to because of an "informality". The specification has been amended as requested by the Examiner. The specification has also been carefully amended to correct minor typographical errors. No new matter has been added. It is submitted that the specification now fulfills all the requirements of 35 U.S.C. § 112. Therefore, it is respectfully submitted that the objection to the specification should be withdrawn.

Claims 1, 10, 11, and 20 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants have amended claims 10 and 20 in light of the specific comments of the Examiner, and submit that all pending claims are now clear and

definite. Therefore, it is respectfully submitted that the rejection of claims 1, 10, 11, and 20 under 35 U.S.C. § 112, second paragraph, should be withdrawn.

Claims 1-5, 7-15, and 17-20 were rejected under 35 U.S.C. § 102(b) as being anticipated by Applicants' Admitted Prior Art ("AAPA"). This rejection is respectfully traversed.

The present invention is directed to improved driving circuits for electronically controlled motors. One embodiment of the present invention provides a driving circuit for an electronically switched motor. The driving circuit includes a supply voltage rectifying stage, first and second control blocks, first and second switching means, magnetic means, transmission diodes, first energy storing means, an energy return stage, and first and second energetic conversion means. The rectifying stage provides a rectified supply voltage, and the first switching means switches state based on at least one output signal of the first control block. The magnetic means provides a magnetic flux according to the state of the first switching means, and the transmission diodes transmit an exciting current that flows through the magnetic means.

The first energy storing means stores the exciting current flowing through the plurality of diodes, and the energy return stage transfers the energy stored in the first energy storing means to the rectifying stage. The second switching means is controlled by an output signal of the second control block. The first energetic conversion means is coupled to the first energy storing means for receiving the energy stored in the first energy storing means by means of the second switching means. The second energetic conversion means is coupled between the rectifying stage and the magnetic means, and is energetically coupled with the first energetic conversion means.

The AAPA discloses a C - dump converter and a PFC type stage for such a converter. However, the AAPA does not disclose a driving circuit for an electronically switched motor that includes first energetic conversion means coupled to first energy storing means for receiving the energy stored in the first energy storing means by means of second switching means, and second energetic conversion means energetically coupled with the first energetic conversion means and

coupled between a rectifying stage and magnetic means, as is recited in amended claim 1.

Amended claim 11 contains similar recitations.

The AAPA discloses a C - dump converter and a PFC type stage for such a converter. As shown in Figure 1, the converter includes a filtering stage 2, a successive conversion stage 3, an energy return stage 10, and a control device 8. The conversion stage 3 supplies the three phases of an electronically switched motor. The energy return stage 10 includes an inductance L1 and a diode D' in series, and a capacitor Cd with one electrode connected to ground and the other electrode connected to a chopping switch Td. The cathodes of three diodes D1, D2, and D3 of the conversion stage 3 are connected between the switch Td and the capacitor Cd. The switch Td is placed in high side configuration.

The PFC filtering stage includes a generator Vac, a rectifying stage 11, and a filtering stage 12, as shown in Figure 2. The filtering stage 12 is composed of an inductance L2, a capacitor C2, a switch T, and a diode D". With this structure, the generator circuit of the AAPA must generate both portions of the double ramp voltage signal through the single PMOS output transistor. Thus, the converter of the AAPA has a driver connected in high side configuration for controlling the switching of the dump switch. This requires an isolated power supply or a charge pump.

In contrast, in the embodiments of the present invention recited in claims 1 and 11, the driving circuit includes first and second energetic conversion means. As shown in Figure 3, the first energetic conversion means Ls is coupled to first energy storing means Cr for receiving the energy stored in the first energy storing means Cr by means of second switching means Tr. The second energetic conversion means Lp is energetically coupled with the first energetic conversion means Ls and is coupled between a rectifying stage 25 and magnetic means P1-P3. With this structure, the present invention allows a unitary Power Factor to be obtained, so a PFC filtering stage is not required. Additionally, the second switching means Tr is in low side configuration so that an isolated power supply or a charge pump is not required.

The AAPA does not teach or suggest a driving circuit for an electronically switched motor that includes first energetic conversion means coupled to first energy storing means for receiving the energy stored in the first energy storing means, and second energetic conversion

means energetically coupled with the first energetic conversion means and coupled between a rectifying stage and magnetic means. Applicants believe that the differences between the AAPA and the present invention are clear in amended claims 1 and 11, which set forth a driving circuit and motor according to embodiments of the present invention. Therefore, claims 1 and 11 distinguish over the AAPA, and the rejection of these claims under 35 U.S.C. § 102(b) should be withdrawn.

As discussed above, claims 1 and 11 distinguish over the AAPA, and thus, claims 2-5 and 7-10, and claims 12-15 and 17-20 (which depend from claims 1 and 11, respectively) also distinguish over the AAPA. Therefore, it is respectfully submitted that the rejection of claims 1-5, 7-15, and 17-20 under 35 U.S.C. § 102(b) should be withdrawn.

Applicants thank the Examiner for indicating that claims 6 and 16 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims. Claim 6 has been rewritten in independent form. Additionally, claim 16 depends from amended claim 11, which Applicants respectfully submit is allowable over the art of record. Accordingly, it is respectfully submitted that claims 6 and 16 are in condition for allowance.

Claims 21-23 have been added by this amendment, and are provided to further define the invention disclosed in the specification. Claims 21-23 are allowable for at least the reasons set forth above with respect to claims 1-20.

Applicants have examined the references cited by the Examiner as pertinent but not relied upon. It is believed that these references neither disclose nor make obvious the invention recited in the present claims. In view of the foregoing, it is respectfully submitted that the application and the claims are in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is invited to call the undersigned attorney at (561) 989-9811 should the Examiner believe a telephone interview would advance the prosecution of the application.

Respectfully submitted,

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By: _____


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